D0 CRYOGENIC CONTROLS
UNINTERRUPTIBLE POWER SYSTEM
INSTALLATION AND OPERATION DETAILS

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DANGER- THE UPS MAY STILL HAVE LETHAL VOLTAGES AND CURRENTS EVEN THOUGH POWER IS DISCONNECTED.

Overview: D0 cryogenic controls are protected from commercial power interruption by an Uninterruptible Power Supply(UPS). The UPS will provide power for a minimum of 20 minutes, and its power source is an emergency power panel for longer term power outages. Emergency power is an emergency generator that supplies power to panels designated as emergency power automatically on commercial power disruption.

The instrument air compressor, water cooling pumps, vacuum pumps, cooling tower, ventilation equipment and the UPS are all on emergency power. This power configuration along with the configuration of the cryogenic controls is such that all cryogenic process controls will continue to function without commercial power for an indefinite time.

The UPS system performs other services besides providing backup power, such as noise filtering, surge protection, output isolation, line condition monitoring, and lightning protection.

Description: UNINTERUPTIBLE POWER SUPPLY

Manufacturer:	Best Power Technology, Inc.
Model:	FC10
Serial #:	C10K-01779
Service Password:	2639
User Password:	377
Capacity:	10 kva
Input:	208 vac- single phase
Output:	208 vac- single phase
Reserve time:	20 minutes at full power

UPS Alarms: The UPS monitors many of its parameters and emits a coded audio tone upon a swing past an alarm setpoint. This setpoint is adjustable through the keypad. Alarms can be accessed through the keypad via a digital display. Refer to the owners manual for these operations and the alarm codes. The owners manual is in the control room in the manufacturers files.

There are two alarms that have relay driven outputs which the cryogenic controls monitor. They are "UPS inverter on" and "UPS parameter alarm". These two alarms are monitored by the alarm supervisor and also by the autodialer system. The "UPS inverter on" alarm signals when the power to the UPS is interrupted and/or lost and the inverter supplies output power from the batteries. The "UPS parameter alarm" is a summation of all the parameter alarms already mentioned. The best way to investigate the "UPS parameter alarm" alarm is the the keypad on the UPS.

UPS operation: The UPS under normal conditions is completely automatic. The UPS monitors the line and will provide power or discontinue providing power as needed. The operator can override the automatic features of the UPS, and for example turn on the inverter for testing. These types of control actions require either the user password or the

service password. The service password gives the operator access to anything that the user password does plus program functions and parameters.

SYSTEM OPERATING MODES

OFF AC output is off. AC line current is interrupted by a solid state relay. The inverter is off. The charger is off. Control logic and displays are powered from batteries or AC line. Alarms will sound for the following conditions: low battery, high ambient temperature, high heatsink temperature.

AUTO The AUTO mode is the normal operating mode. AC output is on, AC input line voltage is connected to the ferroresonant transformer primary. The inverter is normally in readiness. The charger is normally in the auto mode(unless changed to an off or equalize mode). All alarms are capable of sounding.

LINE CONDITIONING AC output is on, and AC line input voltage is connected at the ferroresonant transformer primary. In this mode, line power is being filtered or conditioned by the ferroresonant transformer. The inverter is off and will not come on if the AC input line fails. The charger is normally in the auto mode, and all alarms are capable of sounding.

INVERTER AC output is on with power supplied via the inverter from the batteries. AC input line may be present but it is disconnected from one side of the ferroresonant transformer primary. The charger is off and all alarms are capable of sounding.

UPS BYPASS: The UPS is provided with an external bypass switch mounted on the wall just above the unit. This switch will transfer the load of the UPS to another separate power source in the event that the UPS needs service or is malfunctioning. NOTE: This bypass switch is break before make. The load will be interrupted during the switchover time. Testing this switch casually is not recommended, since control functions and computer memory will be affected.

MAINTENANCE: The UPS and the batteries require no maintenance. The batteries received with this unit are sealed, no maintenance, gas-recombinant, lead acid batteries. The batteries are series connected to provide 120 volts DC. The life of the batteries purchased with the unit is expected to be 3 to 5 years.

FUTURE GOALS: The UPS has serial port (RS232) capability. This serial port can be used for alarm monitoring, UPS programming, parameter changes and display. This is a very informative and useful feature of the UPS. We have yet to implement this feature do to time and material constraints. This may be implemented in the future as an upgrade.

Emergency Power, UPS Survey
April 19,1989
Cryo Controls

Item	**Power Requirement**	**Provision**
PLC (TI565)	120 VAC/350VA	UPS/EP
AST286 (2 each)	120 VAC/600VA	UPS/EP
Multisync II (2 each)	120 VAC/184VA	UPS/EP
Epson FX850	120 VAC/180VA	UPS/EP
Miscellany	120 VAC/300VA	UPS/EP
24V PS	120 VAC/900VA	UPS/EP
I/O Base I	120 VAC/250VA	UPS/EP
I/O Base II	120 VAC/250VA	UPS/EP
I/O Base III	120 VAC/250VA	UPS/EP
ODH Monitors	120 VAC/360VA	UPS/EP
Vacuum R/O	120 VAC/360VA	UPS/EP
Level Gage	120 VAC/360VA	UPS/EP
Other Instruments	120 VAC/360VA	UPS/EP
Total	**120 VAC/43.7KVA**	**UPS/EP**

D0 CRYO CONTROL UNINTERRUPTIBLE POWER DISTRIBUTION PANEL

PP-D0-UPS
120/208 VAC

1 20 amps	2 20 amps
3 20 amps	4 20 amps
5 20 amps	6 20 amps
7 spare	8 20 amps
9 spare	10 spare
11 spare	12 spare
13 spare	14 spare
15 spare	16 spare
17 80 amps	18 spare
19 80 amps	20 spare

1. CRYO CONTROL ROOM
2. HOFFMAN I/O BOX(1st FLOOR)
3. CRYO CONTROL ROOM
4. HOFFMAN I/O BOX(1st FLOOR)
5. CRYO CONTROL ROOM
6. ODH RELAY RACK
7.
8. VACUUM AND LEVEL RELAY RACK
9.
10.
11.
12.
13.
14.
15.
16.
17. 80 AMP MAIN
18.
19. 80 AMP MAIN
20.

PANEL IS LOCATED IN THE SOUTH HALLWAY AT GROUND LEVEL